

# **HEALTH ADVISORY:**

## **FISH CONSUMPTION GUIDELINES FOR CLEAR LAKE, CACHE CREEK, AND BEAR CREEK (LAKE, YOLO, AND COLUSA COUNTIES)**

**January 2005**

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## EXECUTIVE SUMMARY

The Office of Environmental Health Hazard Assessment (OEHHA), formerly part of the Department of Health Services (DHS) but now in the California Environmental Protection Agency, issued a health advisory in 1987 for sport fish from Clear Lake (Lake County) based on mercury contamination in edible fish tissue collected from the lake (Appendix I). Since the advisory was issued, additional data have been collected for Clear Lake fishes as well as for fish from surrounding water bodies, including Cache Creek and Bear Creek. The Central Valley Regional Water Quality Control Board (CVRWQCB) compiled a large dataset comprised of historical and more recently collected fish tissue data principally for Clear Lake but including data from the nearby water bodies. The CVRWQCB used this dataset to develop a Total Daily Maximum Load (TMDL) for mercury for Clear Lake to lower mercury levels in the watershed such that human and wildlife health are protected (Cooke, 2002). This dataset was reviewed by OEHHA, and data suitable for issuing fish consumption advisories were selected and used to update the advisory for Clear Lake and to determine whether there may be potential adverse health effects associated with consuming sport fish from Cache Creek and Bear Creek.

Mercury is a trace metal that can be toxic to humans and other organisms. Mercury occurs naturally in the environment, and is also redistributed in the environment as a result of human activities such as mining and the burning of fossil fuels. Once mercury is released into the environment, it cycles through land, air, and water. In aquatic systems, it undergoes chemical transformation to the organic form, methylmercury, which accumulates in fish and other organisms. More than 95 percent of the mercury found in fish occurs as methylmercury, which is a highly toxic form of the element. Consumption of fish is the major route of exposure to methylmercury in the United States. For more information on mercury, see Appendix II.

The critical target of methylmercury toxicity is the nervous system, particularly in developing organisms such as the fetus and young children. Significant methylmercury toxicity can occur to the fetus during pregnancy even in the absence of symptoms in the mother. In 1985, the United States Environmental Protection Agency (U.S. EPA) set a reference dose (RfD, that is the daily exposure likely to be without significant risks of deleterious effects during a lifetime) for methylmercury of  $3 \times 10^{-4}$  milligrams per kilogram of body weight per day (mg/kg-day), based on central nervous system effects (ataxia, or loss of muscular coordination; and paresthesia, a sensation of numbness and tingling) in adults. This RfD was lowered to  $1 \times 10^{-4}$  mg/kg-day in 1995 (and confirmed in 2001), based on developmental neurologic abnormalities in infants exposed *in utero*. Because OEHHA finds convincing evidence that the fetus is more sensitive than adults to the neurotoxic effects of mercury, but also recognizes that fish can play an important role in a healthy diet, OEHHA chooses to use both the current and previous U.S. EPA reference doses for two distinct population groups. In this advisory, the current RfD based on effects in infants will be used for women of childbearing age and children aged 17 years and younger. The previous RfD, based on effects in adults, will be used for women beyond their childbearing years and men.

Sufficient data were available to characterize the concentrations of mercury for the following species and locations: largemouth bass, smallmouth bass, channel catfish, white catfish, brown bullhead, carp, black crappie, white crappie, Sacramento blackfish, and hitch in Clear Lake; and bluegill, sucker, Sacramento pikeminnow, and hardhead in Cache Creek. The data for each species from each of these locations were combined to set consumption guidelines as this would

allow for health protective advice to be issued even when some sample sizes were limited. This option also allows for more consistent advice to be provided, which facilitates communication. Data for crayfish from Clear Lake were also evaluated and used to develop consumption guidelines for these shellfish.

In Bear Creek, sufficient samples were limited to two species: Sacramento sucker and Sacramento pikeminnow. In this case, mean mercury concentrations in fish from Bear Creek were considerably higher than concentrations for the same species in Cache Creek, and consequently, advice was developed independently for Bear Creek. Results from other studies conducted in the Cache Creek watershed supported this decision.

Mercury concentrations were compared to guidance tissue levels for methylmercury, which are designed so that individuals consuming no more than a preset number of meals should not exceed the RfD for this chemical. Evaluation of data and comparison with guidance tissue levels for methylmercury indicated that fish consumption advisories were appropriate for Clear Lake, Cache Creek, and Bear Creek. Consumers should be informed of the potential hazards from eating fish from these water bodies, particularly those hazards relating to the developing fetus and children. All individuals, especially women of childbearing age and children aged 17 years and younger, are advised to limit their fish consumption to reduce methylmercury ingestion to a level as close to the reference dose as possible. To help sport fish consumers achieve this goal, OEHHA has developed the advisories contained in this report. Meal sizes should be adjusted to body weight as described in the advisory table.

For general advice on how to limit your exposure to chemical contaminants in sport fish (*e.g.*, eating smaller fish of legal size), see the California Sport Fish Consumption Advisories (<http://www.oehha.ca.gov/fish.html>) or Appendix III. Site-specific advice for other California water bodies can be found online at: [http://www.oehha.ca.gov/fish/so\\_cal/index.html](http://www.oehha.ca.gov/fish/so_cal/index.html). It should be noted that, unlike the case for many organic contaminants, various cooking and cleaning techniques will not reduce the methylmercury content of fish.

## HEALTH ADVISORY

Fish are nutritious and should be part of a healthy, balanced diet. As with many other kinds of food, however, it is prudent to consume fish in moderation, particularly when chemical contaminants such as methylmercury are present in fish at concentrations that pose a concern for public health. OEHHA provides the following consumption advice to the public so that people can continue to eat fish from these locations without putting their health at risk.

FISH AND SHELLFISH CONSUMPTION GUIDELINES FOR CLEAR LAKE AND CACHE CREEK	
<b>Women of childbearing age and children 17 years and younger may eat:</b>	
<b>Once a month</b>	Largemouth bass, smallmouth bass, channel catfish, white catfish, brown bullhead, green sunfish, black crappie, white crappie, Sacramento blackfish, Sacramento pikeminnow, hardhead, or Sacramento sucker <b>OR:</b>
<b>Once a week</b>	Bluegill, hitch, carp, trout, or crayfish
<b>Women beyond childbearing age and men may eat:</b>	
<b>Once a week</b>	Largemouth bass, smallmouth bass, channel catfish, white catfish, brown bullhead, green sunfish, black crappie, white crappie, Sacramento blackfish, Sacramento pikeminnow, hardhead, or Sacramento sucker <b>OR:</b>
<b>3 times a week</b>	Bluegill, hitch, carp, trout, or crayfish
FISH AND SHELLFISH CONSUMPTION GUIDELINES FOR BEAR CREEK	
<b>DO NOT EAT</b>	No one should eat any fish or shellfish from Bear Creek
<p><b>MANY OTHER WATER BODIES ARE KNOWN OR SUSPECTED TO HAVE ELEVATED MERCURY LEVELS.</b> If guidelines are not already in place for the water body where you fish, women of childbearing age and children 17 and younger may eat up to one sport fish meal per week, and women beyond childbearing age and men may eat up to three sport fish meals per week from any location.</p> <p><b>EAT SMALLER FISH OF LEGAL SIZE.</b> Fish accumulate mercury as they grow.</p> <p><b>DO NOT COMBINE FISH CONSUMPTION ADVICE.</b> If you eat multiple species or catch fish from more than one area, the recommended guidelines for different species and locations should not be combined. For example, if you eat a meal of fish from the one meal per month category, you should not eat another fish species containing mercury for at least one month.</p> <p><b>SERVE SMALLER MEALS TO CHILDREN.</b> Meal size is assumed to be 8 ounces for a 160-pound adult. If you weigh more or less than 160 pounds, add or subtract one ounce to your meal size, respectively, for each 20-pound difference in body weight.</p> <p><b>CONSIDER YOUR TOTAL FISH CONSUMPTION.</b> Fish from many sources (including stores and restaurants) can contain elevated levels of mercury and other contaminants. <b>IF YOU EAT FISH WITH LOWER CONTAMINANT LEVELS (INCLUDING COMMERCIAL FISH) YOU CAN SAFELY EAT MORE FISH.</b> The American Heart Association recommends that healthy adults eat at least two servings of fish per week. Shrimp, king crab, scallops, farmed catfish, wild salmon, oysters, tilapia, flounder, and sole generally contain some of the lowest levels of mercury.</p>	

# CLEAR LAKE, CACHE CREEK AND BEAR CREEK SPORT FISH

Note: Images are not to scale

**Largemouth Bass** (*Micropterus salmoides*)



Duane Raver, USFWS

**Smallmouth Bass** (*Micropterus dolomieu*)



Duane Raver, USFWS

**Channel Catfish** (*Ictalurus punctatus*)



Duane Raver, USFWS

**White Catfish** (*Amereius catus*)



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**Brown Bullhead** (*Ameiurus nebulosus*)



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**Green Sunfish** (*Lepomis cyanellus*)



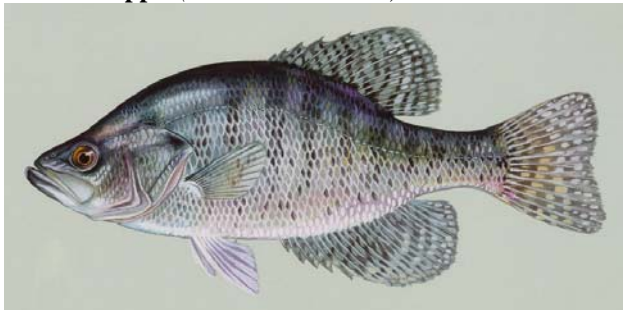
Duane Raver, USFWS

**Black Crappie** (*Pomoxis nigromaculatus*)



Duane Raver, USFWS

**White Crappie** (*Pomoxis annularis*)



Duane Raver, USFWS

**Sacramento Blackfish** (*Orthodon microlepidotus*)



Zak Sutphin, USBR

**Sacramento Pikeminnow** (*Ptychocheilus grandis*)



Rene' Reyes, USBR

**Hardhead** (*Mylopharodon conocephalus*)



Rene' Reyes, USBR

**Sacramento Sucker** (*Catostomus occidentalis*)



Rene' Reyes, USBR

**Hitch** (*Lavinia exilicauda*)



Rene' Reyes, USBR



**Carp** (*Cyprinus carpio*)



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**Bluegill** (*Lepomis macrochirus*)



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**Louisiana or Red swamp crayfish** (*Procambarus clarkii*)



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